



QUALCOMM Incorporated

5775 Morehouse Drive
San Diego, CA 92121-1714

www.qualcomm.com

Via Email and Mail

February 23, 2018

Mr. Thomas Goode, ATIS General Counsel
ATIS
1200 G. Street, NW
Suite 500
Washington, DC 20005
Email: patents@atis.org


RE: Updated and corrected commitment to previous disclosures made by Qualcomm Incorporated on June 25, 2015, October 3, 2016 and February 21, 2018

Dear Mr. Goode:

Our apologies for using the wrong form for our ATIS disclosures dated June 25, 2015, October 3, 2016 and February 21, 2018. Qualcomm hereby agrees that in addition to the promises and representations made in association with these three earlier disclosure forms, Qualcomm commits to the following statement for each of those earlier disclosures.

The Party submitting this Statement agrees that the patent holder (or party authorized to make assurances on its behalf) will, in any documents transferring ownership of patents subject to the assurance, include provisions sufficient to ensure that the commitments in the assurance are binding on the transferee, and that the transferee will similarly include appropriate provisions in the event of future transfers with the goal of binding each successor-in-interest. This assurance is intended to be binding on successors-in-interest regardless of whether such provisions are included in the relevant transfer documents.

Executed this 23 day of February, 2018, for Qualcomm Incorporated, by:



Michael Atlass, Sr. Director and Legal Counsel
Qualcomm Incorporated.

Please confirm receipt of this letter at your earliest convenience via email to my attention at ip.disclosure@qualcomm.com. If you have any questions or concerns, please call 858-587-1121.



Michael Atlass
Sr. Director, Legal Counsel
California Registered In-House Counsel

MA/go



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San Diego, CA 92121-1714

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Via Email and Mail

February 21, 2018

Mr. Thomas Goode
ATIS General Counsel
ATIS
1200 G. Street, NW
Suite 500
Washington, DC 20005
Email: patents@atis.org

RE: Patent Holder Statement on behalf of QUALCOMM Incorporated for M.2012_Revision_3

Dear Mr. Goode:

Please find attached Qualcomm Incorporated's Patent Holder Statement for M.2012_Revision_3.

Please confirm receipt of this Statement at your earliest convenience via email to my attention at ip.disclosure@qualcomm.com. If you have any questions or concerns, please contact me directly at 858-587-1121. Thank you.

Sincerely,

A handwritten signature in blue ink, appearing to read 'TR', followed by a long horizontal flourish.

Thomas R. Rouse
VP & Legal Counsel
Standards Policy & Compliance
Qualcomm Incorporated

TR/go

ALLIANCE FOR TELECOMMUNICATIONS INDUSTRY SOLUTIONS

PATENT HOLDER STATEMENT

Please return via mail, email (scanned with signature), or fax to:

General Counsel

ATIS

1200 G Street, N.W., Suite 500

Washington, D.C. 20005 USA

Fax: +1 (888) 874-0973

Email: patents@atis.org

This form may be used consistent with ATIS' Intellectual Property Rights Policy, which may be found in ATIS Operating Procedures (Version 5.1), Section 10.4 by the holder of a patented invention that may be required for adopting, complying with or otherwise utilizing an ATIS-developed American National Standard or other ATIS deliverable.

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No discussion or negotiation of license terms is permitted in any Forum or Committee. For further information regarding the licensing of any patented inventions identified in this Statement, please contact the person identified in Section B.

A. PARTY SUBMITTING THE STATEMENT

Legal Name (e.g. XYZ Corp.):

QUALCOMM Incorporated

B. CONTACT FOR LICENSING INFORMATION

Contact Name:	Thomas R. Rouse	Title:	VP & Legal Counsel, Standards Policy & Compliance
Department:	QTL		
Telephone:	858-587-1121	Fax:	858-651-0933
Email:	ip.disclosure@qualcomm.com		

C. ATIS-DEVELOPED AMERICAN NATIONAL STANDARD OR OTHER ATIS DELIVERABLE

Please complete a separate Patent Holder Statement for each standard/deliverable.

ATIS Forum/Committee:	WTSC
ATIS Document Number:	See attached list
Title:	M.2012_Revision_3
Other tracking identifiers*, if appropriate:	

*Note: If the standard/deliverable information is not available, please provide available tracking identifiers (e.g., Committee and Issue number, working text number, contribution number).

D. LICENSING ASSURANCE

In accordance with Section 10.4 of the ATIS Operating Procedures, the Party submitting this Statement hereby declares the following (**check box 1, 2a, 2b or 2c and either box 3a or 3b**):

- ☐ 1. The Party submitting this Statement does not hold or does not currently intend holding any invention the use of which would be required for compliance with the ATIS-developed American National Standard or other ATIS deliverable identified in Section C.
2. The Party submitting this Statement may hold a patent covering an invention the use of which may be required for compliance with the ATIS-developed American National Standard or other ATIS deliverable identified in Section C, and with respect to claim(s) of such patent(s), as may be specified more particularly in Section E, that are required for compliance with that ATIS-developed American National Standard or other ATIS deliverable (**check only one box**):
- ☐ a. An irrevocable license will be made available under reasonable terms and conditions that are demonstrably free of any unfair discrimination, without compensation, to applicants desiring to utilize the license for the purpose of implementing the American National Standard or other ATIS deliverable;
- Mark here ☐ if the Party submitting this Statement reserves the right to obtain compensation from applicants who are only willing to license, for compensation, their claim(s) of patents covering an invention, the use of which is required for compliance with the ATIS-developed American National Standard or other ATIS deliverable identified in Section C, on reasonable terms and conditions that are demonstrably free of any unfair discrimination.
- or
- ☒ b. An irrevocable license will be made available under reasonable terms and conditions that are demonstrably free of any unfair discrimination, with compensation, to applicants desiring to utilize the license for the purpose of implementing the American National Standard or other ATIS deliverable;
- Mark here ☒ if such licensing assurance is subject to applicant reciprocity.
- or
- ☐ c. Is unwilling or unable to grant licenses according to the provisions of either 2a or 2b.

3. If the Party submitting this Statement has checked box 2a or 2b, please indicate whether (*check a or b below*):

- ☐ a. The license assurance is provided for any claim(s) of any patent(s) owned or controlled by the Party submitting this Statement, and which such Party has a right to license, covering an invention the use of which is required for compliance with the American National Standard or other ATIS deliverable identified in Section C, including the claim(s) of the patent(s) identified in Section E, if any; or
- ☒ b. The license assurance is provided only for the claim(s) of the patent(s) identified in Section E covering an invention the use of which is required for compliance with the American National Standard or other ATIS deliverable identified in Section C.


E. IDENTIFICATION OF PATENTS

(Completion of the following information is optional if D3a is selected. If D3b is selected, please provide the information indicated below for each patent or application. Attach additional sheets as necessary.)

Patent No. or Application No. (if pending)	Country	Status (Granted/ Pending)	Title	Relevance*
See attached list				

* Note: A Party may, at its discretion, provide further information or explanation in respect of the invention's relevance to the American National Standard or other ATIS Deliverable identified in Section C.

F. SIGNATURE

Name of Authorized Person (type or print legibly):	Thomas R. Rouse
Signature of Authorized Person:	
Title:	VP & Legal Counsel, Standards Policy & Compliance
Date:	February 21, 2018

For more information regarding ATIS' patent policy, please see Section 10.4 of the ATIS Operating Procedures (Version 5.1), which is available online at www.atis.org/op.pdf.

Please return via mail, email (scanned with signature), or fax to:

General Counsel

ATIS

1200 G Street, N.W., Suite 500

Washington, D.C. 20005 USA

Fax: +1 (888) 874-0973

Email: patents@atis.org

Patent No. or Application No. (if pending)	Country	Status	Title	Specification
9,118,387	United States	Granted	PILOT REFERENCE TRANSMISSION FOR A WIRELESS COMMUNICATION SYSTEM	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.302V821-2014; ATIS.3GPP.36.401V880-2012
9,124,344	United States	Granted	Pilot reference transmission for a wireless communication system	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.302V821-2014; ATIS.3GPP.36.401V880-2012
7,289,473	United States	Granted	Pilot Reference Transmission for a Wireless Communication System	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.302V821-2014; ATIS.3GPP.36.401V880-2012
7,190,687	United States	Granted	Method and apparatus for requesting point-to-point protocol (PPP) instances from a packet data services network	ATIS.3GPP.24.301V8100-2012
7,773,547	United States	Granted	Method and apparatus for requesting point-to-point protocol (PPP) instances from a packet data services network	ATIS.3GPP.24.301V8100-2012
6,535,739	United States	Granted	METHOD OF HANDOFF WITHIN A TELECOMMUNICATIONS SYSTEM CONTAINING DIGITAL BASE STATIONS WITH DIFFERENT SPECTRAL CAPABILITIES	ATIS.3GPP.25.214V8130-2014; ATIS.3GPP.25.308V8111-2014; ATIS.3GPP.36.300V10120-2015
7,373,149	United States	Granted	Method of handoff within a telecommunications system containing digital base stations with different spectral capabilities	ATIS.3GPP.25.214V8130-2014; ATIS.3GPP.25.308V8111-2014; ATIS.3GPP.36.300V10120-2015
6,853,843	United States	Granted	Method of handoff within a telecommunications system containing digital base stations with different spectral capabilities	ATIS.3GPP.25.214V8130-2014; ATIS.3GPP.25.308V8111-2014; ATIS.3GPP.36.300V10120-2015
7,151,933	United States	Granted	Method of handoff within a telecommunications system containing digital base stations with different spectral capabilities	ATIS.3GPP.25.214V8130-2014; ATIS.3GPP.25.308V8111-2014; ATIS.3GPP.36.300V10120-2015
6,996,069	United States	Granted	Method and apparatus for controlling transmit power of multiple channels in a CDMA communication system	ATIS.3GPP.25.214V11110-2016
7,936,690	United States	Granted	Method and apparatus for controlling transmit power of multiple channels in a CDMA communication system	ATIS.3GPP.25.214V11110-2016
7,813,441	United States	Granted	Multiplexing of real time services and non-real time services for OFDM systems	ATIS.3GPP.36.212V880-2010
8,194,776	United States	Granted	Multiplexing of real time services and non-real time services for OFDM systems	ATIS.3GPP.36.212V880-2010
6,952,454	United States	Granted	Multiplexing of real time services and non-real time services for OFDM systems	ATIS.3GPP.36.212V880-2010

Qualcomm Incorporated
February 21, 2018

Patent No. or Application No. (if pending)	Country	Status	Title	Specification
7,664,193	United States	Granted	Multiplexing of real time services and non-real time services for OFDM systems	ATIS.3GPP.36.212V880-2010
7,751,492	United States	Granted	Multiplexing of real time services and non-real time services for OFDM systems	ATIS.3GPP.36.212V880-2010
14/296,081	United States	Application	Multiplexing of real time services and non-real time services for OFDM systems	ATIS.3GPP.36.212V880-2010
7,127,654	United States	Granted	Method and an apparatus for a quick retransmission of signals in a communication system	ATIS.3GPP.36.300V8120-2010
6,694,469	United States	Granted	METHOD AND AN APPARATUS FOR A QUICK RETRANSMISSION OF SIGNALS IN A COMMUNICATION SYSTEM	ATIS.3GPP.36.300V8120-2010
7,613,978	United States	Granted	Method and an apparatus for a quick retransmission of signals in a communication system	ATIS.3GPP.36.300V8120-2010
7,088,701	United States	Granted	METHOD AND APPARATUS FOR ADAPTIVE TRANSMISSION CONTROL IN A HIGH DATA RATE COMMUNICATION SYSTEM	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.322V880-2012
8,363,576	United States	Granted	Method and apparatus for multiplexing high-speed packet data transmission with voice/data transmission	ATIS.3GPP.36.211V890-2010
6,775,254	United States	Granted	Method and Apparatus for Multiplexing High-Speed Packet Data Transmission with Voice/Data Transmission	ATIS.3GPP.36.211V890-2010
8,139,545	United States	Granted	Method and apparatus for forwarding messages among multiple radio networks	ATIS.3GPP.23.272V9150-2014
6,961,329	United States	Granted	Method and apparatus for forwarding messages among multiple radio networks	ATIS.3GPP.23.272V9150-2014
7,042,869	United States	Granted	Method and Apparatus for Gated ACK/NAK Channel in a Communication System	ATIS.3GPP.36.213V880-2010
7,068,683	United States	Granted	Method and apparatus for high rate packet data and low delay data transmissions	ATIS.3GPP.36.213V1240-2015
9,426,821	United States	Granted	Method and apparatus for high rate packet data and low delay data transmissions	ATIS.3GPP.36.213V1240-2015
9,107,109	United States	Granted	Method and apparatus for determining a data rate in a high rate packet data wireless communications system	ATIS.3GPP.36.101V8260-2016; ATIS.3GPP.36.331V8210-2016
6,973,098	United States	Granted	Method and Apparatus for Determining a Data Rate in a High Rate Packet Data Wireless Communications System	ATIS.3GPP.36.101V8260-2016; ATIS.3GPP.36.331V8210-2016
7,860,061	United States	Granted	Method and apparatus for handoff of a wireless packet data services connection	ATIS.3GPP.24.008V8190-2014; ATIS.3GPP.24.301V8100-2012
7,561,555	United States	Granted	Method and apparatus for handoff of a wireless packet data services connection	ATIS.3GPP.24.008V8190-2014; ATIS.3GPP.24.301V8100-2012
7,079,511	United States	Granted	Method and Apparatus for Handoff of a Wireless Packet Data Services Connection	ATIS.3GPP.24.008V8190-2014; ATIS.3GPP.24.301V8100-2012
7,411,929	United States	Granted	Method and Apparatus for Utilizing Channel State Information in a Wireless Communication System	ATIS.3GPP.36.212V1080-2015

Qualcomm Incorporated
February 21, 2018

Patent No. or Application No. (if pending)	Country	Status	Title	Specification
7,949,060	United States	Granted	Method and apparatus for utilizing channel state information in a wireless communication system	ATIS.3GPP.36.212V1080-2015
6,771,706	United States	Granted	Method and Apparatus for Utilizing Channel State Information in a Wireless Communication System	ATIS.3GPP.36.212V1080-2015
7,590,182	United States	Granted	Method and apparatus for utilizing channel state information in a wireless communication system	ATIS.3GPP.36.212V1080-2015
7,349,425	United States	Granted	Method and Apparatus for Overhead Messaging in a Wireless Communication System	ATIS.3GPP.36.331V9180-2016
6,731,936	United States	Granted	Method and System for a Handoff in a Broadcast Communication System	ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.304V1160-2015
7,937,086	United States	Granted	Method and system for a handoff in a broadcast communication system	ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.304V1160-2015
7,254,394	United States	Granted	Method and System for a Handoff in a Broadcast Communication System	ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.304V1160-2015
8,644,170	United States	Granted	Rate selection for an OFDM system	ATIS.3GPP.36.212V880-2010
7,012,883	United States	Granted	Rate Selection for An OFDM System	ATIS.3GPP.36.212V880-2010
8,089,940	United States	Granted	Method and system for efficient and reliable data packet transmission	ATIS.3GPP.36.321V8120-2014
8,711,763	United States	Granted	Random access for wireless multiple-access communication systems	ATIS.3GPP.25.331V11120-2016
8,169,944	United States	Granted	Random access for wireless multiple-access communication systems	ATIS.3GPP.25.331V11120-2016
7,042,857	United States	Granted	Uplink Pilot and Signaling Transmission in Wireless Communication Systems	ATIS.3GPP.36.331V8210-2016
8,724,555	United States	Granted	Uplink pilot and signaling transmission in wireless communication systems	ATIS.3GPP.36.331V8210-2016
6,928,062	United States	Granted	Uplink Pilot and Signaling Transmission in Wireless Communication Systems	ATIS.3GPP.36.331V8210-2016
9,155,106	United States	Granted	Uplink pilot and signaling transmission in wireless communication systems	ATIS.3GPP.36.331V8210-2016
7,146,130	United States	Granted	Wireless Local Access Network System Detection and Selection	ATIS.3GPP.25.331V1240-2016
8,064,927	United States	Granted	Wireless local access network system detection and selection	ATIS.3GPP.25.331V1240-2016
7,778,593	United States	Granted	Wireless local access network system detection and selection	ATIS.3GPP.25.331V1240-2016
7,280,467	United States	Granted	Pilot transmission schemes for wireless multi-carrier communication systems	ATIS.3GPP.36.300V8120-2010

Patent No. or Application No. (if pending)	Country	Status	Title	Specification
7,062,272	United States	Granted	Method and Apparatus to Track Count of Broadcast Content Recipients in a Wireless Telephone Network	ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.300V1240-2015
7,813,732	United States	Granted	Method and apparatus to track count of broadcast content recipients in a wireless telephone network	ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.300V1240-2015
7,251,487	United States	Granted	Method and Apparatus to Track Count of Broadcast Content Recipients in a Wireless Telephone Network	ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.300V1240-2015
7,409,212	United States	Granted	Method and Apparatus to Track Count of Broadcast Content Recipients in a Wireless Telephone Network	ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.300V1240-2015
7,280,562	United States	Granted	Variable Packet Lengths for High Packet Data Rate Communications	ATIS.3GPP.36.331V8210-2016
8,576,894	United States	Granted	Systems and methods for using code space in spread-spectrum communications	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.211V1070-2013
8,705,588	United States	Granted	Systems and methods for using code space in spread-spectrum communications	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.211V1070-2013
7,668,125	United States	Granted	Incremental redundancy transmission for multiple parallel channels in a MIMO communication system	ATIS.3GPP.36.212V880-2010; ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.321V8120-2014
8,873,365	United States	Granted	Transmit diversity processing for a multi-antenna communication system	ATIS.3GPP.36.300V8120-2010
8,934,329	United States	Granted	Transmit diversity processing for a multi-antenna communication system	ATIS.3GPP.36.300V8120-2010
7,002,900	United States	Granted	Transmit Diversity Processing for a Multi-Antenna Communication System	ATIS.3GPP.36.300V8120-2010
8,060,129	United States	Granted	Peer-to-peer communications	ATIS.3GPP.36.212V1230-2015; ATIS.3GPP.36.300V1240-2015
7,539,507	United States	Granted	Peer-to-peer communications	ATIS.3GPP.36.212V1230-2015; ATIS.3GPP.36.300V1240-2015

Patent No. or Application No. (if pending)	Country	Status	Title	Specification
8,023,474	United States	Granted	Systems and methods for communicating control data using multiple slot formats	ATIS.3GPP.25.211V1210-2016; ATIS.3GPP.36.213V880-2010
7,474,643	United States	Granted	Systems and Methods for Communicating Control data Using Multiple Slot Formats	ATIS.3GPP.25.211V1210-2016; ATIS.3GPP.36.213V880-2010
8,204,149	United States	Granted	Spatial spreading in a multi-antenna communication system	ATIS.3GPP.36.211V890-2010
8,903,016	United States	Granted	Spatial spreading in a multi-antenna communication system	ATIS.3GPP.36.211V890-2010
9,787,375	United States	Granted	Spatial spreading in a multi-antenna communication system	ATIS.3GPP.36.211V890-2010
15/728,407	United States	Application	SPATIAL SPREADING IN A MULTI-ANTENNA COMMUNICATION SYSTEM	ATIS.3GPP.36.211V890-2010
8,582,621	United States	Granted	Synchronized broadcast/multicast communication	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.331V9180-2016
8,619,835	United States	Granted	Synchronized broadcast/multicast communication	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.331V9180-2016
8,363,697	United States	Granted	Synchronized broadcast/multicast communication	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.331V9180-2016
8,737,538	United States	Granted	Synchronized broadcast/multicast communication	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.331V9180-2016
8,638,765	United States	Granted	System and method for distributing wireless network access parameters	ATIS.3GPP.36.300V1350-2017
7,653,037	United States	Granted	System and method for distributing wireless network access parameters	ATIS.3GPP.36.300V1350-2017
8,995,547	United States	Granted	Systems and methods for reducing uplink resources to provide channel performance feedback for adjustment of downlink MIMO channel data rates	ATIS.3GPP.36.211V890-2010
7,706,324	United States	Granted	On-demand reverse-link pilot transmission	ATIS.3GPP.36.212V1080-2015; ATIS.3GPP.36.213V10120-2015
8,259,669	United States	Granted	On-demand reverse-link pilot transmission	ATIS.3GPP.36.212V1080-2015; ATIS.3GPP.36.213V10120-2015
8,000,221	United States	Granted	Adaptive pilot insertion for a MIMO-OFDM system	ATIS.3GPP.36.211V1070-2013; ATIS.3GPP.36.212V1080-2015
8,547,820	United States	Granted	Adaptive pilot insertion for a MIMO-OFDM system	ATIS.3GPP.36.211V1070-2013; ATIS.3GPP.36.212V1080-2015
9,137,822	United States	Granted	Efficient signaling over access channel	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.331V8210-2016
15/499,705	United States	Application	EFFICIENT SIGNALING OVER ACCESS CHANNEL	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.331V8210-2016

Patent No. or Application No. (if pending)	Country	Status	Title	Specification
14/821,664	United States	Application	Efficient signaling over access channel	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.331V8210-2016
15/846,510	United States	Application	EFFICIENT SIGNALING OVER ACCESS CHANNEL	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.331V8210-2016
8,693,383	United States	Granted	Method and apparatus for high rate data transmission in wireless communication	ATIS.3GPP.25.308V811-2014; ATIS.3GPP.36.300V1240-2015
9,350,514	United States	Granted	SENDING FULL CHANNEL QUALITY INDICATION REPORTS ON TDM CHANNEL IN WIRELESS COMMUNICATION	ATIS.3GPP.25.308V811-2014; ATIS.3GPP.36.300V1240-2015
9,319,201	United States	Granted	REVERSE LINK PILOT WITH SELECTIVE GATING IN WIRELESS COMMUNICATION	ATIS.3GPP.25.308V811-2014; ATIS.3GPP.36.300V1240-2015
9,407,418	United States	Granted	CHANNELIZING PACKET ACKNOWLEDGMENTS FOR MULTIPLE DATA CHANNELS IN WIRELESS COMMUNICATION	ATIS.3GPP.25.308V811-2014; ATIS.3GPP.36.300V1240-2015
15/160,879	United States	Allowed	SENDING FULL CHANNEL QUALITY INDICATION REPORTS ON TDM CHANNEL IN WIRELESS COMMUNICATION	ATIS.3GPP.25.308V811-2014; ATIS.3GPP.36.300V1240-2015
8,942,713	United States	Granted	Method and apparatus for allocating resources in a multicast/broadcast communications system	ATIS.3GPP.36.304V1330-2017; ATIS.3GPP.36.331V1330-2017
8,095,141	United States	Granted	Use of supplemental assignments	ATIS.3GPP.36.321V8120-2014
8,706,144	United States	Granted	1x and 1xEV-DO hybrid call setup	ATIS.3GPP.36.304V9110-2014
9,474,044	United States	Granted	1x and 1xEV-DO hybrid call setup	ATIS.3GPP.36.304V9110-2014
7,961,700	United States	Granted	Multi-carrier operation in data transmission systems	ATIS.3GPP.25.211V870-2012; ATIS.3GPP.25.214V8130-2014; ATIS.3GPP.25.308V811-2014; ATIS.3GPP.25.331V8250-2016; ATIS.3GPP.36.212V1080-2015; ATIS.3GPP.36.300V10120-2015
8,169,980	United States	Granted	Methods and apparatuses for interworking	ATIS.3GPP.36.300V11120-2015; ATIS.3GPP.36.331V1130-2013
9,408,220	United States	Granted	Channel quality reporting for adaptive sectorization	ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.331V8210-2016
9,307,544	United States	Granted	Channel quality reporting for adaptive sectorization	ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.331V8210-2016
8,798,666	United States	Granted	Methods and apparatus for mobile terminal-based radio resource management and wireless network optimization	ATIS.3GPP.36.331V8210-2016
9,839,005	United States	Granted	Methods and apparatus for mobile terminal-based radio resource management and wireless network optimization	ATIS.3GPP.36.331V8210-2016

Patent No. or Application No. (if pending)	Country	Status	Title	Specification
7,965,789	United States	Granted	Reverse link power control for an OFDMA system	ATIS.3GPP.36.213V10120-2015
8,520,745	United States	Granted	Reverse link power control for an OFDMA system	ATIS.3GPP.36.213V10120-2015
8,718,181	United States	Granted	Reverse link power control for an OFDMA system	ATIS.3GPP.36.213V10120-2015
8,639,190	United States	Granted	Precoding for segment sensitive scheduling in wireless communication systems	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.212V880-2010
8,971,823	United States	Granted	Precoding for segment sensitive scheduling in wireless communication systems	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.212V880-2010
8,565,194	United States	Granted	Puncturing signaling channel for a wireless communication system	ATIS.3GPP.36.212V880-2010
13/955,980	United States	Application	Puncturing signaling channel for a wireless communication system	ATIS.3GPP.36.212V880-2010
9,130,810	United States	Granted	OFDM communications methods and apparatus	ATIS.3GPP.36.213V880-2010
9,426,013	United States	Granted	OFDM communications methods and apparatus	ATIS.3GPP.36.213V880-2010
6,785,256	United States	Granted	Method for extending mobile IP and AAA to enable integrated support for local access and roaming access connectivity	ATIS.3GPP.24.302V1270-2016
8,179,840	United States	Granted	Method for extending mobile IP and AAA to enable integrated support for local access and roaming access connectivity	ATIS.3GPP.24.302V1270-2016
7,525,937	United States	Granted	Method for extending mobile IP and AAA to enable integrated support for local access and roaming access connectivity	ATIS.3GPP.24.302V1270-2016
7,398,111	United States	Granted	Methods and apparatus for operating mobile nodes in multiple states	ATIS.3GPP.36.321V10100-2015
6,961,595	United States	Granted	Methods and apparatus for operating mobile nodes in multiple states	ATIS.3GPP.36.321V10100-2015
7,610,024	United States	Granted	Methods and apparatus of providing transmit and/or receive diversity with multiple antennas in wireless communication systems	ATIS.3GPP.36.211V890-2010
7,039,370	United States	Granted	Methods and apparatus of providing transmit and/or receive diversity with multiple antennas in wireless communication systems	ATIS.3GPP.36.211V890-2010
8,571,493	United States	Granted	Methods and apparatus of providing transmit and/or receive diversity with multiple antennas in wireless communication systems	ATIS.3GPP.36.211V890-2010
9,485,761	United States	Granted	Method and apparatus for sending data and control information in a wireless communication system	ATIS.3GPP.36.300V8120-2010
8,374,161	United States	Granted	Method and apparatus for sending data and control information in a wireless communication system	ATIS.3GPP.36.300V8120-2010
11/775,198	United States	Application	Frequency hopping in an SC-FDMA environment	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.331V8210-2016

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8,477,593	United States	Granted	Method and apparatus for sending signaling for data transmission in a wireless communication system	ATIS.3GPP.36.213V880-2010
8,902,861	United States	Granted	Method and apparatus for sending signaling for data transmission in a wireless communication system	ATIS.3GPP.36.213V880-2010
8,223,625	United States	Granted	Acquisition in frequency division multiple access systems	ATIS.3GPP.36.331V8210-2016
8,599,706	United States	Granted	Random access signaling transmission for system access in wireless communication	ATIS.3GPP.36.101V1350-2017
8,374,150	United States	Granted	Re-synchronization of temporary UE IDS in a wireless communication system	ATIS.3GPP.36.300V8120-2010
9,161,212	United States	Granted	Method and apparatus for re-synchronizing of temporary UE IDS in a wireless communication system	ATIS.3GPP.36.300V8120-2010
8,599,712	United States	Granted	METHOD AND APPARATUS FOR SETTING REVERSE LINK CQI REPORTING MODES IN WIRELESS COMMUNICATION SYSTEM	ATIS.3GPP.36.211V890-2010
7,924,800	United States	Granted	METHOD AND APPARATUS FOR SETTING REVERSE LINK CQI REPORTING MODES IN WIRELESS COMMUNICATION SYSTEM	ATIS.3GPP.36.211V890-2010
9,125,078	United States	Granted	Method and apparatus for setting reverse link CQI reporting modes in wireless communication system	ATIS.3GPP.36.211V890-2010
8,705,441	United States	Granted	Joint use of multi-carrier and single-carrier multiplexing schemes for wireless communication	ATIS.3GPP.36.213V10120-2015
8,873,513	United States	Granted	Methods and apparatus for transferring a mobile device from a source eNB to a target eNB	ATIS.3GPP.36.300V8120-2010
8,660,085	United States	Granted	Methods and apparatus for transferring a mobile device from a source eNB to a target eNB	ATIS.3GPP.36.300V8120-2010
8,660,080	United States	Granted	Mapping uplink acknowledgement resource based on downlink control channel	ATIS.3GPP.36.300V8120-2010
8,169,956	United States	Granted	Mapping uplink acknowledgement transmission based on downlink virtual resource blocks	ATIS.3GPP.36.300V8120-2010
8,577,377	United States	Granted	Methods and apparatus for providing a wireless expansion network	ATIS.3GPP.36.300V1350-2017; ATIS.3GPP.36.331V1330-2017
9,661,650	United States	Granted	Method and apparatus for UL ACK allocation	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.331V8210-2016
9,084,277	United States	Granted	Method and apparatus for UL ACK allocation	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.331V8210-2016
8,559,321	United States	Granted	Mobile IP home agent discovery	ATIS.3GPP.24.008V8190-2014
9,351,145	United States	Granted	Mobile IP home agent discovery	ATIS.3GPP.24.008V8190-2014
7,920,598	United States	Granted	Scrambling methods for synchronization channels	ATIS.3GPP.36.213V880-2010
8,005,091	United States	Granted	APPARATUS AND METHOD OF GENERATING AND MAINTAINING HYBRID CONNECTION IDENTIFICATIONS (IDS) FOR PEER-TO-PEER WIRELESS NETWORKS	ATIS.3GPP.36.300V1240-2015

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8,300,715	United States	Granted	Method and apparatus for reuse of WAN infrastructure resources in a wireless peer-to-peer (P2P) network	ATIS.3GPP.36.213V1240-2015
8,180,058	United States	Granted	Encryption of the scheduled uplink message in random access procedure	ATIS.3GPP.36.331V8210-2016
8,081,603	United States	Granted	Compression static and semi-static context transfer	ATIS.3GPP.36.331V1241-2015
8,767,739	United States	Granted	Optimizing in-order delivery of data packets during wireless communication handover	ATIS.3GPP.36.300V8120-2010
9,609,557	United States	Granted	Optimizing in-order delivery of data packets during wireless communication handover	ATIS.3GPP.36.300V8120-2010
9,306,795	United States	Granted	MULTIPLEXING AND TRANSMISSION OF TRAFFIC DATA AND CONTROL INFORMATION IN A WIRELESS COMMUNICATION SYSTEM	ATIS.3GPP.36.211V890-2010
8,467,367	United States	Granted	Multiplexing and transmission of traffic data and control information in a wireless communication system	ATIS.3GPP.36.211V890-2010
8,654,690	United States	Granted	Switching carriers to join a multicast session within a wireless communications network	ATIS.3GPP.36.300V11120-2015
9,014,155	United States	Granted	Access point configuration schemes	ATIS.3GPP.36.423V890-2010
7,860,036	United States	Granted	METHODS AND APPARATUS FOR INCLUDING MODE INFORMATION IN A FRAME FOR SYSTEM ACQUISITION	ATIS.3GPP.36.211V890-2010
8,780,767	United States	Granted	Methods and apparatus for including mode information in a frame for system acquisition	ATIS.3GPP.36.211V890-2010
8,437,312	United States	Granted	Methods for intra base station handover optimizations	ATIS.3GPP.36.331V1241-2015
8,284,734	United States	Granted	Methods for intra base station handover optimizations	ATIS.3GPP.36.331V1241-2015
9,125,139	United States	Granted	Mobile access in a diverse access point network	ATIS.3GPP.25.331V8250-2016; ATIS.3GPP.36.331V8210-2016
8,588,738	United States	Granted	Mobile access in a diverse access point network	ATIS.3GPP.25.331V8250-2016; ATIS.3GPP.36.331V8210-2016
8,948,749	United States	Granted	System and method to facilitate acquisition of access point base stations	ATIS.3GPP.36.331V8210-2016
9,119,132	United States	Granted	Efficient system identification schemes for communication systems	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.331V8210-2016
14/800,408	United States	Application	Efficient system identification schemes for communication systems	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.331V8210-2016
8,285,281	United States	Granted	Methods and apparatus for self configuring network relations	ATIS.3GPP.25.484V1020-2014; ATIS.3GPP.36.331V8210-2016
8,600,413	United States	Granted	Control arrangement and method for communicating paging messages in a wireless communication system	ATIS.3GPP.36.304V8100-2012
9,131,464	United States	Granted	Control arrangement and method for communicating paging messages in a wireless communication system	ATIS.3GPP.36.304V8100-2012
8,639,997	United States	Granted	Buffer status report triggers in wireless communications	ATIS.3GPP.36.300V8120-2010

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9,021,144	United States	Granted	Buffer status report triggers in wireless communications	ATIS.3GPP.36.300V8120-2010
8,964,653	United States	Granted	Peer-to-peer device identification and cognitive communication	ATIS.3GPP.36.213V1330-2017
14/629,378	United States	Allowed	Peer-to-peer device identification and cognitive communication	ATIS.3GPP.36.213V1330-2017
9,210,700	United States	Granted	Simultaneous transmission of acknowledgement, channel quality indicator and scheduling request	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.212V880-2010; ATIS.3GPP.36.212V1080-2015
8,848,620	United States	Granted	Simultaneous transmission of acknowledgement, channel quality indicator and scheduling request	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.212V880-2010; ATIS.3GPP.36.212V1080-2015
8,781,425	United States	Granted	Methods and apparatus for handling a signaling message that relates to transmission rate restrictions	ATIS.3GPP.25.331V8250-2016
8,145,164	United States	Granted	METHODS AND APPARATUS FOR HANDLING A SIGNALING MESSAGE THE RELATES TO TRANSMISSION RATE RESTRICTIONS	ATIS.3GPP.25.331V8250-2016
9,215,731	United States	Granted	METHOD AND APPARATUS FOR TRANSFER OF A MESSAGE ON A COMMON CONTROL CHANNEL FOR RANDOM ACCESS IN A WIRELESS COMMUNICATION NETWORK	ATIS.3GPP.36.300V8120-2010; ATIS.3GPP.36.323V860-2010
8,149,773	United States	Granted	Resource allocation for enhanced uplink using an acquisition indicator channel	ATIS.3GPP.25.214V8130-2014
8,605,675	United States	Granted	Resource allocation for enhanced uplink using an acquisition indicator channel	ATIS.3GPP.25.214V8130-2014
8,472,967	United States	Granted	Allocating transmit power among two or more carriers assigned to a wireless communication device	ATIS.3GPP.25.321V9100-2014
8,787,181	United States	Granted	Resource allocation randomization	ATIS.3GPP.36.213V880-2010
9,036,564	United States	Granted	Dynamic assignment of ACK resource in a wireless communication system	ATIS.3GPP.36.321V8120-2014
9,439,212	United States	Granted	Dynamic assignment of ACK resource in a wireless communication system	ATIS.3GPP.36.321V8120-2014
8,711,785	United States	Granted	Fast carrier allocation in multi-carrier systems	ATIS.3GPP.36.331V10150-2015
8,665,804	United States	Granted	Filtering semi-persistent scheduling false alarms	ATIS.3GPP.36.212V1151-2015
8,165,026	United States	Granted	Method and apparatus to report and manage cells in a multi carrier system	ATIS.3GPP.25.308V8111-2014; ATIS.3GPP.36.300V10120-2015
9,363,745	United States	Granted	Device managed access point lists in wireless communications	ATIS.3GPP.36.304V9110-2014
8,477,734	United States	Granted	Reporting of ACK and CQI information in a wireless communication system	ATIS.3GPP.25.213V850-2010; ATIS.3GPP.25.308V8111-2014
9,735,928	United States	Granted	Scrambling and modulation to constrain the constellation size of ACK/NAK transmission on the data channel	ATIS.3GPP.36.213V10120-2015; ATIS.3GPP.36.321V8120-2014

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8,737,517	United States	Granted	Scrambling and modulation to constrain the constellation size of ACK/NAK transmission on the data channel	ATIS.3GPP.36.213V10120-2015; ATIS.3GPP.36.321V8120-2014
9,107,239	United States	Granted	Systems and methods to define control channels using reserved resource blocks	ATIS.3GPP.36.213V1190-2015; ATIS.3GPP.36.331V1130-2013
14/789,332	United States	Application	Systems and methods to define control channels using reserved resource blocks	ATIS.3GPP.36.213V1190-2015; ATIS.3GPP.36.331V1130-2013
14/599,775	United States	Application	Systems and methods to define control channels using reserved resource blocks	ATIS.3GPP.36.213V1190-2015; ATIS.3GPP.36.331V1130-2013
9,628,223	United States	Granted	Bundling of ACK information in a wireless communication system	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.300V8120-2010
8,634,333	United States	Granted	Bundling of ACK information in a wireless communication system	ATIS.3GPP.36.211V890-2010; ATIS.3GPP.36.300V8120-2010
8,432,939	United States	Granted	Using guard carriers for extra channels	ATIS.3GPP.36.104V1350-2017; ATIS.3GPP.36.211V1330-2017; ATIS.3GPP.36.331V1330-2017
8,559,359	United States	Granted	Information exchange mechanisms to achieve network QoS in wireless cellular systems	ATIS.3GPP.36.423V1242-2015
9,119,212	United States	Granted	Inter-cell interference cancellation framework	ATIS.3GPP.36.331V1241-2015
8,687,545	United States	Granted	Anchor carrier in a multiple carrier wireless communication system	ATIS.3GPP.36.321V10100-2015
14/985,262	United States	Application	ANCHOR CARRIER IN A MULTIPLE CARRIER WIRELESS COMMUNICATION SYSTEM	ATIS.3GPP.36.321V10100-2015
9,225,481	United States	Granted	Downlink grants in a multicarrier wireless communication system	ATIS.3GPP.36.212V1080-2015
8,626,162	United States	Granted	Registration and access control in femto cell deployments	ATIS.3GPP.25.367V950-2012
9,510,272	United States	Granted	Registration and access control in femto cell deployments	ATIS.3GPP.25.367V950-2012
9,078,270	United States	Granted	Opportunistic relay scheduling in wireless communications	ATIS.3GPP.36.216V1031-2013
8,184,599	United States	Granted	Management of UE operation in a multi-carrier communication system	ATIS.3GPP.25.211V870-2012; ATIS.3GPP.25.212V880-2016; ATIS.3GPP.25.308V8111-2014; ATIS.3GPP.36.300V10120-2015
9,014,301	United States	Granted	Dedicated reference signal	ATIS.3GPP.36.212V1080-2015
8,078,111	United States	Granted	Methods and apparatus for using multiple frequency bands for communication	ATIS.3GPP.36.213V10120-2015
9,019,902	United States	Granted	Channel quality feedback in multicarrier systems	ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.331V10150-2015

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8,971,933	United States	Granted	Method and apparatus for determining DRX cycle used for paging	ATIS.3GPP.36.331V1330-2017
6,801,786	United States	Granted	Method for the control of communication and communications system	ATIS.3GPP.36.300V8120-2010
RE41,773	United States	Granted	Signalling method	ATIS.3GPP.36.300V8120-2010
6,535,979	United States	Granted	Method of ciphering data transmission, and cellular radio system	ATIS.3GPP.36.300V1240-2015; ATIS.3GPP.36.323V1220-2015; ATIS.3GPP.36.331V1241-2015
7,167,447	United States	Granted	Transporting QoS mapping information in a packet radio network	ATIS.3GPP.24.008V8190-2014
8,155,005	United States	Granted	TRANSPORTING QOS MAPPING INFORMATION IN A PACKET RADIO NETWORK	ATIS.3GPP.24.008V8190-2014
7,003,290	United States	Granted	Measurement reporting in a telecommunication system	ATIS.3GPP.36.133V82310-2016; ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.300V8120-2010
7,499,701	United States	Granted	Measurement reporting in a telecommunication system	ATIS.3GPP.36.133V82310-2016; ATIS.3GPP.36.214V870-2010; ATIS.3GPP.36.300V8120-2010
7,096,021	United States	Granted	Method for initiating in a terminal of a cellular network the measurement of power levels of signals and a terminal	ATIS.3GPP.36.214V870-2010
9,622,228	United States	Granted	Data and control multiplexing in wireless communications	ATIS.3GPP.36.213V1190-2015
9,705,653	United States	Granted	Downlink control transmission in multicarrier operation	ATIS.3GPP.36.213V1330-2017
9,374,131	United States	Granted	Frequency hopping in a wireless communication network	ATIS.3GPP.36.331V8210-2016
8,521,207	United States	Granted	Closed-loop power control in multi-carrier high-speed uplink packet access	ATIS.3GPP.25.319V970-2014; ATIS.3GPP.36.213V10120-2015
8,571,550	United States	Granted	Managing access control to closed subscriber groups	ATIS.3GPP.24.008V9120-2014; ATIS.3GPP.24.301V9110-2014
8,937,901	United States	Granted	Carrier timing for wireless communications systems	ATIS.3GPP.25.214V980-2014
9,094,991	United States	Granted	Method and apparatus for supporting communication in low SNR scenario	ATIS.3GPP.36.213V10120-2015; ATIS.3GPP.36.213V1190-2015; ATIS.3GPP.36.213V1330-2017
9,585,108	United States	Granted	Method and apparatus for uplink power control in a multicarrier wireless communication system	ATIS.3GPP.36.212V1080-2015; ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.331V10150-2015

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15/444,210	United States	Allowed	METHOD AND APPARATUS FOR UPLINK POWER CONTROL IN A MULTICARRIER WIRELESS COMMUNICATION SYSTEM	ATIS.3GPP.36.212V1080-2015; ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.331V10150-2015
8,599,771	United States	Granted	Control of radio links in a multiple carrier system	ATIS.3GPP.25.214V980-2014; ATIS.3GPP.36.133V82310-2016
9,236,985	United States	Granted	Method and apparatus for control and data multiplexing in a MIMO communication system	ATIS.3GPP.36.211V1070-2013; ATIS.3GPP.36.213V10120-2015; ATIS.3GPP.36.300V10120-2015
9,119,133	United States	Granted	Local internet protocol access capability indication	ATIS.3GPP.24.301V10150-2016
9,225,495	United States	Granted	DATA TRANSMISSION WITH CROSS-SUBFRAME CONTROL IN A WIRELESS NETWORK	ATIS.3GPP.36.212V1330-2017; ATIS.3GPP.36.213V1330-2017
9,565,011	United States	Granted	Data transmission with cross-subframe control in a wireless network	ATIS.3GPP.36.212V1330-2017; ATIS.3GPP.36.213V1330-2017
9,209,933	United States	Granted	METHOD AND APPARATUS FOR DISPATCHING A CHANNEL QUALITY INDICATOR FEEDBACK IN MULTICARRIER SYSTEM	ATIS.3GPP.36.300V10120-2015
14/960,067	United States	Application	METHOD AND APPARATUS FOR DISPATCHING A CHANNEL QUALITY INDICATOR FEEDBACK IN MULTICARRIER SYSTEM	ATIS.3GPP.36.300V10120-2015
09106378.0	United States	Granted	Systems, apparatus and methods for communicating downlink information	ATIS.3GPP.36.211V1330-2017; ATIS.3GPP.36.213V1330-2017
8,634,313	United States	Granted	Method and apparatus that facilitates a timing alignment in a multicarrier system	ATIS.3GPP.36.133V11110-2015; ATIS.3GPP.36.321V1150-2015; ATIS.3GPP.36.331V1130-2013
8,767,639	United States	Granted	Systems and methods for providing feedback in an enhanced uplink network	ATIS.3GPP.25.319V970-2014
9,065,617	United States	Granted	MIMO related signaling in wireless communication	ATIS.3GPP.36.211V1070-2013
9,351,293	United States	Granted	Multiple carrier indication and downlink control information interaction	ATIS.3GPP.36.331V10150-2015
9,281,932	United States	Granted	Methods and apparatus for subframe interlacing in heterogeneous networks	ATIS.3GPP.36.214V1010-2011; ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.423V1070-2015

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8,942,192	United States	Granted	Methods and apparatus for subframe interlacing in heterogeneous networks	ATIS.3GPP.36.214V1010-2011; ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.423V1070-2015
14/978,547	United States	Application	Methods and apparatus for subframe interlacing in heterogeneous networks	ATIS.3GPP.36.214V1010-2011; ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.423V1070-2015
8,638,682	United States	Granted	Method and apparatus for conducting measurements when multiple carriers are supported	ATIS.3GPP.36.133V10170-2015
9,078,164	United States	Granted	Method and apparatus for conducting measurements when multiple carriers are supported	ATIS.3GPP.36.133V10170-2015
9,007,914	United States	Granted	Methods and apparatus for enabling rate adaptation across network configurations	ATIS.3GPP.24.229V9190-2014
8,767,797	United States	Granted	Apparatus and method for providing HARQ feedback in a multi-carrier wireless communication system	ATIS.3GPP.25.308V1060-2014
9,055,576	United States	Granted	Uplink resource allocation for LTE advanced	ATIS.3GPP.36.213V10120-2015
8,934,331	United States	Granted	Circuit switched fallback procedure	ATIS.3GPP.36.413V9100-2016
8,571,122	United States	Granted	Method and apparatus for multiplexing data and control information in wireless communication systems based on frequency division multiple access	ATIS.3GPP.36.212V880-2010
7,613,245	United States	Granted	Method and apparatus for multiplexing data and control information in wireless communication systems based on frequency division multiple access	ATIS.3GPP.36.212V880-2010
7,929,590	United States	Granted	Method and apparatus for multiplexing data and control information in wireless communication systems based on frequency division multiple access	ATIS.3GPP.36.212V880-2010
7,697,631	United States	Granted	Method and apparatus for multiplexing data and control information in wireless communication systems based on frequency division multiple access	ATIS.3GPP.36.212V880-2010
8,848,520	United States	Granted	Aperiodic sounding reference signal transmission method and apparatus	ATIS.3GPP.36.212V1080-2015
8,477,672	United States	Granted	4C-HSDPA acknowledgment signaling	ATIS.3GPP.25.213V1000-2012
9,225,413	United States	Granted	Methods and systems for uplink transmit diversity	ATIS.3GPP.36.211V1070-2013
14/970,478	United States	Allowed	Methods and systems for uplink transmit diversity	ATIS.3GPP.36.211V1070-2013
9,083,501	United States	Granted	Feedback of control information for multiple carriers	ATIS.3GPP.36.213V10120-2015
14/743,211	United States	Application	Feedback of control information for multiple carriers	ATIS.3GPP.36.213V10120-2015

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8,666,398	United States	Granted	Random access procedure enhancements for heterogeneous networks	ATIS.3GPP.36.331V1330-2017
14/137,468	United States	Application	Random access procedure enhancements for heterogeneous networks	ATIS.3GPP.36.331V1330-2017
9,084,149	United States	Granted	Radio link monitoring (RLM) and reference signal received power (RSRP) measurement for heterogeneous networks	ATIS.3GPP.36.300V10120-2015
8,712,401	United States	Granted	Radio link monitoring (RLM) and reference signal received power (RSRP) measurement for heterogeneous networks	ATIS.3GPP.36.300V10120-2015
9,271,167	United States	Granted	DETERMINATION OF RADIO LINK FAILURE WITH ENHANCED INTERFERENCE COORDINATION	ATIS.3GPP.36.300V10120-2015; ATIS.3GPP.36.423V1070-2015
8,982,743	United States	Granted	DAI designs for FDD carrier aggregation	ATIS.3GPP.36.212V1230-2015; ATIS.3GPP.36.212V1330-2017; ATIS.3GPP.36.213V1240-2015; ATIS.3GPP.36.213V1330-2017
13/167,383	United States	Allowed	Control information signaling for MIMO transmissions	ATIS.3GPP.36.212V1080-2015; ATIS.3GPP.36.213V10120-2015
9,781,709	United States	Granted	Reporting of channel properties in heterogeneous networks	ATIS.3GPP.36.300V10120-2015
9,307,431	United States	Granted	Reporting of channel properties in heterogeneous networks	ATIS.3GPP.36.300V10120-2015
8,565,205	United States	Granted	Specific absorption rate backoff in power headroom report	ATIS.3GPP.36.101V10170-2015; ATIS.3GPP.36.213V10120-2015
9,173,192	United States	Granted	Target cell selection for multimedia broadcast multicast service continuity	ATIS.3GPP.36.331V1130-2013
14/838,287	United States	Application	Target cell selection for multimedia broadcast multicast service continuity	ATIS.3GPP.36.331V1130-2013
14/838,285	United States	Application	Target cell selection for multimedia broadcast multicast service continuity	ATIS.3GPP.36.331V1130-2013
14/838,209	United States	Application	Target cell selection for multimedia broadcast multicast service continuity	ATIS.3GPP.36.331V1130-2013
9,578,649	United States	Granted	Method and apparatus to facilitate support for multi-radio coexistence	ATIS.3GPP.36.331V1241-2015
9,591,593	United States	Granted	Systems, methods and apparatus for radio uplink power control	ATIS.3GPP.25.214V1210-2016
9,241,287	United States	Granted	Narrow Bandwidth Operation in LTE	ATIS.3GPP.36.213V1330-2017
14/956,306	United States	Application	Narrow Bandwidth Operation in LTE	ATIS.3GPP.36.213V1330-2017
13/625,414	United States	Application	Systems and methods for traffic detection network control	ATIS.3GPP.24.312V1160-2014

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9,232,540	United States	Granted	Random access channel design for narrow bandwidth operation in a wide bandwidth system	ATIS.3GPP.36.211V1330-2017; ATIS.3GPP.36.213V1330-2017
9,608,899	United States	Granted	PACKET-BASED AGGREGATION OF DATA STREAMS ACROSS DISPARATE NETWORKING INTERFACES	ATIS.3GPP.36.300V1350-2017
13/793,587	United States	Application	Methods and apparatus for uplink power control	ATIS.3GPP.25.211V1210-2016; ATIS.3GPP.25.214V1210-2016
9,635,644	United States	Granted	Downlink coverage enhancements	ATIS.3GPP.36.306V1330-2017
15/494,457	United States	Application	DOWNLINK COVERAGE ENHANCEMENTS	ATIS.3GPP.36.306V1330-2017
9,232,509	United States	Granted	Apparatus and methods for improving demodulation reliability of an uplink high speed-dedicated physical control channel	ATIS.3GPP.25.214V1210-2016
9,264,930	United States	Granted	Buffer status reporting and logical channel prioritization in multiflow operation	ATIS.3GPP.36.300V1350-2017; ATIS.3GPP.36.323V1331-2017
14/978,325	United States	Application	Buffer status reporting and logical channel prioritization in multiflow operation	ATIS.3GPP.36.300V1350-2017; ATIS.3GPP.36.323V1331-2017
14/158,915	United States	Application	Determining to use multi-RAN interworking by correlating different RAN identifiers	ATIS.3GPP.36.463V1310-2017
9,888,457	United States	Granted	Single-frequency network (SFN) operation for machine-type communications (MTC) coverage enhancements	ATIS.3GPP.36.331V1330-2017
9,497,733	United States	Granted	Single-frequency network (SFN) operation for machine-type communications (MTC) coverage enhancements	ATIS.3GPP.36.331V1330-2017
9,854,457	United States	Granted	Management of communications with multiple access points based on inter-access point communications	ATIS.3GPP.36.463V1310-2017
9,420,576	United States	Granted	PD SCH transmission schemes with compact downlink control information (DCI) format in new carrier type (NCT) in LTE	ATIS.3GPP.36.212V1330-2017
14/254,528	United States	Application	CONTROL-LESS OPERATION FOR COVERAGE LIMITED MACHINE-TYPE-COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017
14/261,388	United States	Application	X2 setup and routing at an X2-gateway	ATIS.3GPP.36.423V1242-2015
14/268,786	United States	Application	Routing modification based on handover detection	ATIS.3GPP.36.331V1330-2017
9,781,628	United States	Granted	Methods and apparatus for throttling unattended applications at user devices	ATIS.3GPP.36.331V1330-2017
9,713,057	United States	Granted	Techniques for selected internet protocol traffic offload support at an assisting eNodeB	ATIS.3GPP.36.300V1350-2017
14/905,929	United States	Application	DYNAMIC INDICATION OF TIME DIVISION (TDD) DUPLEX UPLINK/DOWNLINK SUBFRAME CONFIGURATIONS	ATIS.3GPP.36.300V1240-2015
14/444,824	United States	Application	Uplink control information (UCI) transmission with bundling considerations	ATIS.3GPP.36.213V1330-2017
14/454,449	United States	Application	Disjoint bearer routing	ATIS.3GPP.36.300V1350-2017
9,414,430	United States	Granted	Techniques for managing radio link failure recovery for a user equipment connected to a WWAN and a WLAN	ATIS.3GPP.36.331V1330-2017

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14/489,122	United States	Application	Base station to access point interface for data bearer routing	ATIS.3GPP.36.300V1350-2017
9,699,677	United States	Granted	Apparatus and methods for performing outer loop power control for frame early termination in wireless communications	ATIS.3GPP.25.331V1240-2016
9,674,710	United States	Granted	Channel dependent coverage enhancement techniques in LTE	ATIS.3GPP.36.211V1330-2017
15/495,867	United States	Application	CHANNEL DEPENDENT COVERAGE ENHANCEMENT TECHNIQUES IN LTE	ATIS.3GPP.36.211V1330-2017
14/576,086	United States	Application	SERVING GATEWAY RELOCATION AND SECONDARY NODE ELIGIBILITY FOR DUAL CONNECTIVITY	ATIS.3GPP.36.300V1240-2015; ATIS.3GPP.36.413V1340-2017
9,854,478	United States	Granted	Techniques for switching bearers between radio access technologies (RATs)	ATIS.3GPP.36.331V1330-2017
14/607,348	United States	Application	Uplink transmit power allocation and power headroom reporting by a user equipment in a multi-connectivity environment	ATIS.3GPP.36.321V1240-2015; ATIS.3GPP.36.331V1241-2015
14/602,034	United States	Application	Compressed mode with DCH enhancements	ATIS.3GPP.25.212V1210-2016
14/569,362	United States	Application	Continuous packet connectivity (CPC) with dedicated channel (DCH) enhancements	ATIS.3GPP.25.214V1210-2016; ATIS.3GPP.25.331V1240-2016
15/313,003	United States	Application	PERIODIC AND APERIODIC CHANNEL STATE INFORMATION (CSI) REPORTING FOR MIMO	ATIS.3GPP.36.213V1330-2017
9,667,331	United States	Granted	Restricted aperiodic CSI measurement reporting in enhanced interference management and traffic adaptation	ATIS.3GPP.36.213V1240-2015
14/673,508	United States	Application	Reporting device statistics in wireless communications	ATIS.3GPP.36.413V1240-2015
14/695,982	United States	Application	Techniques for performing half/full-duplex operations in wireless communications	ATIS.3GPP.36.211V1240-2015
14/728,859	United States	Application	Protected CET transmission and reception	ATIS.3GPP.36.211V1330-2017
9,743,363	United States	Granted	CCA CLEARANCE IN UNLICENSED SPECTRUM	ATIS.3GPP.36.213V1330-2017
15/680,017	United States	Application	CCA CLEARANCE IN UNLICENSED SPECTRUM	ATIS.3GPP.36.213V1330-2017
9,509,486	United States	Granted	Techniques for indicating a frame format for transmissions using unlicensed radio frequency spectrum bands	ATIS.3GPP.36.213V1330-2017
9,763,211	United States	Granted	Open-loop timing and cyclic prefixes in cellular internet of things communication	ATIS.3GPP.36.211V1330-2017
9,510,311	United States	Granted	Open-loop timing and cyclic prefixes in cellular internet of things communication	ATIS.3GPP.36.211V1330-2017
14/825,843	United States	Application	Re-synchronization management in LTE/LTE-A with unlicensed spectrum	ATIS.3GPP.36.213V1330-2017
9,723,651	United States	Granted	ENHANCED CONNECTION MANAGEMENT FOR MULTIPLE ACCESS NETWORKS	ATIS.3GPP.36.300V1350-2017
14/553,980	United States	Application	Random access method of devices with different path loss	ATIS.3GPP.36.321V1330-2017
9,860,888	United States	Granted	UE CATEGORY HANDLING	ATIS.3GPP.36.212V1230-2015
14/542,470	United States	Allowed	Uplink synchronization without preamble in SC-FDMA	ATIS.3GPP.36.211V1330-2017
14/927,210	United States	Application	NARROWBAND CONTROL CHANNEL DECODING	ATIS.3GPP.36.211V1330-2017

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14/950,727	United States	Application	Network identification based on discovery reference signals in wireless communications	ATIS.3GPP.36.211V1330-2017
14/995,437	United States	Application	Uplink control information transmission using PUSCH in enhanced carrier aggregation	ATIS.3GPP.36.213V1330-2017
14/995,453	United States	Application	Channel state information for enhanced carrier aggregation	ATIS.3GPP.36.213V1330-2017
15/537,376	United States	Application	SUPPORT OF TRANSMISSION MODE AND IMPACT ON PDCCH BLIND DECODES OF PTM (POINT-TO-MULTIPOINT) TRANSMISSION	ATIS.3GPP.36.213V1330-2017
15/002,208	United States	Application	Spatial and frequency diversity design for machine type communications (MTC)	ATIS.3GPP.36.211V1330-2017; ATIS.3GPP.36.213V1330-2017
15/549,597	United States	Application	DMRS ENHANCEMENT FOR HIGHER ORDER MU-MIMO	ATIS.3GPP.36.212V1330-2017
15/040,794	United States	Application	RSRP and path loss measurements with coverage enhancements	ATIS.3GPP.36.331V1241-2015
15/061,092	United States	Application	Selection of proximity services relay	ATIS.3GPP.36.331V1330-2017
15/799,908	United States	Application	LOW COST PAGING	ATIS.3GPP.36.300V1350-2017
15/077,740	United States	Allowed	Low cost paging	ATIS.3GPP.36.300V1350-2017
15/080,393	United States	Application	Techniques for managing communications in a shared radio frequency spectrum band	ATIS.3GPP.36.213V1330-2017; ATIS.3GPP.36.331V1330-2017
15/132,988	United States	Allowed	Configurable random access initial power level selection	ATIS.3GPP.36.321V1330-2017
15/132,729	United States	Application	CONTROL CHANNEL BASED BROADCAST MESSAGING	ATIS.3GPP.36.331V1330-2017
15/086,814	United States	Application	Systems, methods, and devices for link quality based relay selection	ATIS.3GPP.36.331V1330-2017
15/563,357	United States	Application	ENHANCED CSI PROCEDURES FOR FD-MIMO	ATIS.3GPP.36.213V1330-2017
15/152,278	United States	Application	Techniques for managing communication links of a plurality of radio access technologies (RATS)	ATIS.3GPP.36.300V1350-2017
15/149,752	United States	Allowed	Control flow enhancements for LTE-unlicensed	ATIS.3GPP.36.213V1330-2017; ATIS.3GPP.36.300V1350-2017
15/178,253	United States	Application	System information for enhanced machine type communication	ATIS.3GPP.36.211V1330-2017
15/183,702	United States	Application	Long-term evolution compatible very narrow band design	ATIS.3GPP.36.211V1330-2017; ATIS.3GPP.36.212V1330-2017
15/181,204	United States	Application	Scheduling assignment transmissions in device-to-device communications	ATIS.3GPP.36.213V1240-2015
15/197,477	United States	Application	Techniques for reporting buffer status in wireless communications	ATIS.3GPP.36.321V1240-2015
8,767,629	United States	Granted	Method for triggering terminal to send sounding reference signal, terminal, and base station	ATIS.3GPP.36.211V1070-2013
9,148,879	United States	Granted	METHOD FOR TRIGGERING TERMINAL TO SEND SOUNDING REFERENCE SIGNAL, TERMINAL, AND BASE STATION	ATIS.3GPP.36.211V1070-2013
15/215,809	United States	Application	Semi-persistent scheduling for enhanced machine type communications	ATIS.3GPP.36.213V1330-2017
15/215,148	United States	Application	Configurable measurement gap and window for machine type communications	ATIS.3GPP.36.306V1330-2017
15/216,442	United States	Allowed	BUNDLE SIZE DETERMINATION FOR NARROWBAND COMMUNICATION	ATIS.3GPP.36.213V1330-2017

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15/232,672	United States	Application	TECHNIQUES FOR HARMONIZATION BETWEEN CRS AND DM-RS BASED TRANSMISSION MODES IN UNLICENSED SPECTRUM	ATIS.3GPP.36.211V1330-2017; ATIS.3GPP.36.213V1330-2017; ATIS.3GPP.36.331V1330-2017
15/244,653	United States	Application	DOWNLINK AND SYNCHRONIZATION TECHNIQUES FOR NARROWBAND WIRELESS COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017
15/244,385	United States	Application	Random access channel design for narrowband wireless communication	ATIS.3GPP.36.331V1330-2017
15/245,640	United States	Application	TECHNIQUES FOR ALLOCATING TIME AND FREQUENCY RESOURCES TO AN UPLINK CHANNEL TO CARRY UPLINK CONTROL INFORMATION USED FOR NARROWBAND COMMUNICATION	ATIS.3GPP.36.213V1330-2017
15/209,505	United States	Application	Uplink design for narrowband LTE (NB-LTE)	ATIS.3GPP.36.211V1330-2017
15/249,948	United States	Application	COMMON SYNCHRONIZATION CHANNEL DESIGN FOR NARROWBAND COMMUNICATIONS	ATIS.3GPP.36.331V10150-2015
15/247,355	United States	Application	DESIGN OF SYNCHRONIZATION SIGNALS FOR NARROWBAND OPERATION	ATIS.3GPP.36.211V1330-2017
15/236,947	United States	Application	DRX AND SPS FOR MTC WITH BUNDLED TRANSMISSIONS	ATIS.3GPP.36.213V1330-2017; ATIS.3GPP.36.321V1330-2017
15/255,069	United States	Application	SYSTEM AND METHOD FOR NARROWBAND UPLINK SINGLE TONE TRANSMISSIONS	ATIS.3GPP.36.211V1330-2017
15/347,382	United States	Application	PHYSICAL LAYER SIGNALING TECHNIQUES IN WIRELESS COMMUNICATIONS SYSTEMS	ATIS.3GPP.36.213V1330-2017
15/279,991	United States	Application	NARROW BAND PRACH WITH MULTIPLE TONE HOPPING DISTANCES	ATIS.3GPP.36.211V1330-2017
15/376,490	United States	Application	METHODS AND APPARATUS FOR A DATA TRANSMISSION SCHEME FOR NARROW-BAND INTERNET OF THINGS (NB-IOT)	ATIS.3GPP.36.211V1330-2017
15/341,753	United States	Application	NARROW BAND PHYSICAL RANDOM ACCESS CHANNEL FREQUENCY HOPPING PATTERNS AND DETECTION SCHEMES	ATIS.3GPP.36.211V1330-2017
15/414,250	United States	Application	SRS TRANSMISSION IN MANAGEMENT IN CARRIER AGGREGATION	ATIS.3GPP.36.213V1330-2017
15/371,885	United States	Application	UPLINK DATA CHANNEL DESIGN FOR NARROWBAND DEVICES	ATIS.3GPP.36.211V1330-2017
15/271,898	United States	Application	NARROW-BAND PHYSICAL CONTROL CHANNEL DESIGN	ATIS.3GPP.36.211V1330-2017
15/387,970	United States	Application	RASTER DESIGN FOR NARROWBAND OPERATION FOR MACHINE TYPE COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017; ATIS.3GPP.36.331V1330-2017
15/272,246	United States	Application	NARROW BAND ACK / NACK TRANSMISSIONS	ATIS.3GPP.36.211V1330-2017; ATIS.3GPP.36.213V1330-2017
15/345,540	United States	Application	UPLINK GRANTS FOR NARROWBAND INTERNET-OF-THINGS	ATIS.3GPP.36.213V1330-2017
15/423,524	United States	Application	ADAPTIVE RADIO LINK MONITORING	ATIS.3GPP.36.133V1350-2017
15/428,242	United States	Application	MULTI-PRB OPERATION FOR NARROWBAND SYSTEMS	ATIS.3GPP.36.213V1330-2017; ATIS.3GPP.36.331V1330-2017
15/397,934	United States	Application	PILOT DESIGN FOR UPLINK (UL) NARROW-BAND INTERNET OF THINGS (NB-IOT)	ATIS.3GPP.36.101V1350-2017

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15/447,914	United States	Application	DOWNLINK POWER ADJUSTMENT IN NARROWBAND WIRELESS COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017
15/376,025	United States	Application	NARROWBAND WIRELESS COMMUNICATIONS CELL SEARCH	ATIS.3GPP.36.211V1330-2017
15/402,927	United States	Application	PERFORMING A CHANNEL STATE INFORMATION MEASUREMENT IN AN ENHANCED MACHINE-TYPE COMMUNICATION	ATIS.3GPP.36.213V1330-2017
15/591,082	United States	Application	ORDERED PHYSICAL RANDOM ACCESS CHANNEL RESOURCE MANAGEMENT	ATIS.3GPP.36.213V1330-2017
15/593,137	United States	Application	UPLINK TRANSMISSION GAPS IN EMTG	ATIS.3GPP.36.211V1330-2017
15/646,018	United States	Application	SUBFRAME VALIDITY AND SYSTEM INFORMATION RECEPTION FOR MACHINE TYPE COMMUNICATION	ATIS.3GPP.36.213V1330-2017
15/445,263	United States	Application	PHASE ROTATION FOR IN-BAND SIGNAL GENERATION FOR NARROW BAND TRANSMISSION	ATIS.3GPP.36.211V1330-2017
15/803,740	United States	Application	SEARCH SPACE DESIGN FOR SEMI-PERSISTENT SCHEDULING (SPS) IN ENHANCED MACHINE-TYPE COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017
15/713,588	United States	Application	RESOURCE INDEX DETERMINATION FOR BUNDLED CHANNEL TRANSMISSION IN SPECIAL SUBFRAMES	ATIS.3GPP.36.213V1330-2017
62/458,810	United States	Application	RESOURCE INDEX DETERMINATION FOR BUNDLED CHANNEL TRANSMISSION IN SPECIAL SUBFRAMES	ATIS.3GPP.36.213V1330-2017
62/459,409	United States	Application	TECHNIQUES AND APPARATUSES FOR NARROWBAND PHYSICAL BROADCAST CHANNEL (NB-PBCH) INTERFERENCE REDUCTION	ATIS.3GPP.36.211V1330-2017
62/458,353	United States	Application	TECHNIQUES AND APPARATUSES FOR NARROWBAND PHYSICAL BROADCAST CHANNEL (NB-PBCH) INTERFERENCE REDUCTION	ATIS.3GPP.36.211V1330-2017
8,064,409	United States	Granted	Method and apparatus using a multi-carrier forward link in a wireless communication system	ATIS.3GPP.25.308V8111-2014; ATIS.3GPP.25.331V8250-2016; ATIS.3GPP.36.300V8120-2010
6,625,198	United States	Granted	Method and apparatus for concurrently processing multiple calls in a spread spectrum communications system	ATIS.3GPP.23.272V8120-2014; ATIS.3GPP.36.331V8210-2016
7,466,741	United States	Granted	Method and apparatus for concurrently processing multiple calls in a spread spectrum communications system	ATIS.3GPP.23.272V8120-2014; ATIS.3GPP.36.331V8210-2016
7,184,459	United States	Granted	Method and apparatus for concurrently processing multiple calls in a spread spectrum communications system	ATIS.3GPP.23.272V8120-2014; ATIS.3GPP.36.331V8210-2016
7,197,017	United States	Granted	Method and apparatus for channel optimization during point-to-point protocol (PPP) session requests	ATIS.3GPP.24.301V8100-2012
8,363,616	United States	Granted	Method and apparatus for channel optimization during point-to-point protocol (PPP) session requests	ATIS.3GPP.24.301V8100-2012
8,213,390	United States	Granted	Reverse link automatic repeat request	ATIS.3GPP.36.213V880-2010
7,564,818	United States	Granted	Reverse Link Automatic Repeat Request	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.300V8120-2010
8,116,283	United States	Granted	Reverse link automatic repeat request	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.300V8120-2010

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8,798,627	United States	Granted	Apparatus and method of handoff between wireless networks	ATIS.3GPP.36.304V1330-2017
7,706,796	United States	Granted	User terminal-initiated hard handoff from a wireless local area network to a cellular network	ATIS.3GPP.36.304V1330-2017
9,065,608	United States	Granted	METHOD OF PROVIDING A GAP INDICATION DURING A STICKY ASSIGNMENT	ATIS.3GPP.36.213V880-2010
8,630,180	United States	Granted	Method of providing a gap indication during a sticky assignment	ATIS.3GPP.36.213V880-2010
8,432,803	United States	Granted	Method of providing a gap indication during a sticky assignment	ATIS.3GPP.36.213V880-2010
8,724,740	United States	Granted	Systems and methods for reducing uplink resources to provide channel performance feedback for adjustment of downlink MIMO channel data rates	ATIS.3GPP.36.211V890-2010
9,178,584	United States	Granted	System and methods for reducing uplink resources to provide channel performance feedback for adjustment of downlink MIMO channel data rates	ATIS.3GPP.36.211V890-2010
9,736,752	United States	Granted	Communications methods and apparatus using physical attachment point identifiers which support dual communications links	ATIS.3GPP.36.331V1330-2017
8,787,323	United States	Granted	Wireless communication methods and apparatus supporting synchronization	ATIS.3GPP.36.331V1241-2015
7,778,643	United States	Granted	Power and timing control methods and apparatus	ATIS.3GPP.36.213V880-2010; ATIS.3GPP.36.331V8210-2016
8,099,099	United States	Granted	Methods and apparatus related to assignment in a wireless communications system	ATIS.3GPP.36.212V880-2010
8,982,778	United States	Granted	Packet routing in a wireless communications environment	ATIS.3GPP.36.331V1330-2017
8,369,800	United States	Granted	Methods and apparatus related to power control and/or interference management in a mixed wireless communications system	ATIS.3GPP.36.213V1240-2015
9,119,163	United States	Granted	Methods and apparatus related to power control and/or interference management in a mixed wireless communications system	ATIS.3GPP.36.213V1240-2015
8,170,572	United States	Granted	Methods and apparatus for supporting quality of service in communication systems	ATIS.3GPP.36.331V8210-2016
7,907,970	United States	Granted	Providing quality of service for various traffic flows in a communications environment	ATIS.3GPP.23.203V8140-2014; ATIS.3GPP.36.300V8120-2010
8,526,410	United States	Granted	Methods and apparatus related to interference management when sharing downlink bandwidth between wide area network usage and peer to peer signaling	ATIS.3GPP.36.213V1240-2015
13/956,724	United States	Application	Methods and apparatus related to interference management when sharing downlink bandwidth between wide area network usage and peer to peer signaling	ATIS.3GPP.36.213V1240-2015
7,986,959	United States	Granted	Preamble based uplink power control for LTE	ATIS.3GPP.36.321V8120-2014

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8,559,889	United States	Granted	Preamble based uplink power control for LTE	ATIS.3GPP.36.321V8120-2014
9,137,755	United States	Granted	Preamble based uplink power control for LTE	ATIS.3GPP.36.321V8120-2014
14/812,996	United States	Allowed	Preamble based uplink power control for LTE	ATIS.3GPP.36.321V8120-2014
9,198,017	United States	Granted	Infrastructure assisted discovery in a wireless peer-to-peer network	ATIS.3GPP.24.334V1211-2016
8,009,617	United States	Granted	Beamforming of control information in a wireless communication system	ATIS.3GPP.25.214V11110-2016; ATIS.3GPP.36.211V1120-2013
8,848,656	United States	Granted	Utilizing broadcast signals to convey restricted association information	ATIS.3GPP.36.300V8120-2010
9,549,367	United States	Granted	Utilizing broadcast signals to convey restricted association information	ATIS.3GPP.36.300V8120-2010
9,820,240	United States	Granted	Virtual scheduling in heterogeneous networks	ATIS.3GPP.36.213V1190-2015
8,971,241	United States	Granted	Techniques for supporting relay operation in wireless communication systems	ATIS.3GPP.36.211V1070-2013
9,288,747	United States	Granted	Switching wireless network selection modes in conjunction with selection of a wireless cell set	ATIS.3GPP.36.300V9100-2014
6,819,937	United States	Granted	Data transmission in a TDMA system	ATIS.3GPP.24.008V8190-2014
9,148,786	United States	Granted	Inclusion/exclusion messaging scheme for indicating whether a network entity performs access control	ATIS.3GPP.36.413V9100-2016
8,842,613	United States	Granted	POWER ALLOCATION IN MULTI-CARRIER ENHANCED UPLINK	ATIS.3GPP.25.319V970-2014
8,457,056	United States	Granted	NON-SCHEDULED GRANTS IN MULTI-CARRIER ENHANCED UPLINK	ATIS.3GPP.25.319V970-2014
9,560,592	United States	Granted	Method and apparatus for signaling in dense network operations	ATIS.3GPP.36.211V1240-2015; ATIS.3GPP.36.331V1241-2015
9,877,282	United States	Granted	Method and apparatus for signaling in dense network operations	ATIS.3GPP.36.211V1240-2015; ATIS.3GPP.36.331V1241-2015
9,839,027	United States	Granted	METHODS AND APPARATUS FOR MANAGING MACHINE-TYPE COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017
9,591,429	United States	Granted	METHODS AND APPARATUS FOR MANAGING MACHINE-TYPE COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017
15/450,543	United States	Application	METHODS AND APPARATUS FOR MANAGING MACHINE-TYPE COMMUNICATIONS	ATIS.3GPP.36.213V1330-2017
9,749,771	United States	Granted	METHODS AND APPARATUS FOR MANAGING MACHINE-TYPE COMMUNICATIONS	ATIS.3GPP.36.211V1330-2017
15/620,481	United States	Application	METHODS AND APPARATUS FOR MANAGING MACHINE-TYPE COMMUNICATIONS	ATIS.3GPP.36.211V1330-2017
9,408,125	United States	Granted	AGGREGATION OF DATA BEARERS FOR CARRIER AGGREGATION	ATIS.3GPP.36.331V1241-2015
15/208,499	United States	Application	AGGREGATION OF DATA BEARERS FOR CARRIER AGGREGATION	ATIS.3GPP.36.331V1241-2015
13/830,355	United States	Application	System and method of offloading traffic to a wireless local area network	ATIS.3GPP.25.331V1240-2016; ATIS.3GPP.36.331V1241-2015

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Patent No. or Application No. (if pending)	Country	Status	Title	Specification
9,473,981	United States	Granted	Concurrent wireless communications over licensed and unlicensed spectrum	ATIS.3GPP.36.300V1350-2017
15/257,457	United States	Application	Concurrent wireless communications over licensed and unlicensed spectrum	ATIS.3GPP.36.300V1350-2017
9,736,829	United States	Granted	DOWNLINK CONTROL MANAGEMENT IN AN UNLICENSED OR SHARED SPECTRUM	ATIS.3GPP.36.213V1330-2017
15/659,451	United States	Application	DOWNLINK CONTROL FORMAT INDICATOR	ATIS.3GPP.36.213V1330-2017
14/494,956	United States	Do Not Pursue	DOWNLINK CONTROL FORMAT INDICATOR	ATIS.3GPP.36.213V1330-2017
8,224,356	United States	Granted	Dual event slotted paging	ATIS.3GPP.25.304V980-2014
7,983,695	United States	Granted	Dual event slotted paging	ATIS.3GPP.25.304V980-2014
8,046,005	United States	Granted	Dual event slotted paging	ATIS.3GPP.25.304V980-2014
6,832,094	United States	Granted	Dual Event Slotted Paging	ATIS.3GPP.25.304V980-2014
7,970,420	United States	Granted	Dual event slotted paging	ATIS.3GPP.25.304V980-2014
7,653,157	United States	Granted	Method and apparatus for coordinating transmission of short messages with hard handoff searches in a wireless communications system	ATIS.3GPP.36.300V8120-2010
6,535,563	United States	Granted	Method and apparatus for coordinating transmission of short messages with hard handoff searches in a wireless communications system	ATIS.3GPP.36.300V8120-2010
7,664,209	United States	Granted	Method and apparatus for coordinating transmission of short messages with hard handoff searches in a wireless communications system	ATIS.3GPP.36.300V8120-2010
7,010,068	United States	Granted	Method and Apparatus for Coordinating Transmission of Short Messages with Hard Handoff Searches in a Wireless Communications System	ATIS.3GPP.36.300V8120-2010
7,715,356	United States	Granted	Distributed infrastructure for wireless data communications	ATIS.3GPP.36.331V1241-2015
7,248,572	United States	Granted	Distributed Infrastructure for Wireless Data Communications	ATIS.3GPP.36.331V1241-2015
8,274,948	United States	Granted	Distributed infrastructure for wireless data communications	ATIS.3GPP.36.331V1241-2015
6,360,100	United States	Granted	Method for Robust Handoff in Wireless Communication System	ATIS.3GPP.36.300V11120-2015
8,588,777	United States	Granted	Method and apparatus for robust handoff in wireless communication systems	ATIS.3GPP.36.300V11120-2015
7,233,794	United States	Granted	Method for Robust Handoff in Wireless Communication System	ATIS.3GPP.36.300V11120-2015
6,256,301	United States	Granted	Reservation Multiple Access	ATIS.3GPP.25.331V8250-2016
6,788,937	United States	Granted	Reservation Multiple Access	ATIS.3GPP.25.331V8250-2016
6,987,982	United States	Granted	Reservation Multiple Access	ATIS.3GPP.25.331V8250-2016
PCT/CN2015/090515	Patent Cooperation Treaty	Application	INCREASED UPLINK PILOT TIME SLOT LENGTH IN SPECIAL SUBFRAMES	ATIS.3GPP.36.213V1330-2017
PCT/CN2016/092763	Patent Cooperation Treaty	Application	Increased uplink pilot time slot length in special subframes	ATIS.3GPP.36.213V1330-2017

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PCT/CN2015/093984	Patent Cooperation Treaty	Application	CSI feedback processing and reporting for EB/FD-MIMO	ATIS.3GPP.36.213V1330-2017
PCT/CN2016/100669	Patent Cooperation Treaty	Application	CSI feedback processing and reporting for EB/FD-MIMO	ATIS.3GPP.36.213V1330-2017
PCT/CN2017/112144	Patent Cooperation Treaty	Application	TECHNIQUES TO HANDLE COLLISIONS BETWEEN UPLINK TRANSMISSIONS AND DOWNLINK TRANSMISSIONS OVER A WIRELESS SPECTRUM	ATIS.3GPP.36.213V1330-2017
PCT/CN2017/077275	Patent Cooperation Treaty	Application	Techniques to handle collisions between uplink transmissions and downlink transmissions over a wireless spectrum	ATIS.3GPP.36.213V1330-2017